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Treatment of vaginal agenesis with modified Abbé–McIndoe technique: long-term follow-up in 22 patients

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Abstract

Objectives : The inlay skin grafting technique proposed by McIndoe is by far the most popular and the safest technique for treatment of vaginal agenesis. The purpose of the current study is to present clinical experiences and long-term results of modified Abbé–McIndoe technique.
Study Design : We present the long-term results of 22 patients with a follow-up period ranging between 7 and 14 years.
Results : Mean vaginal depth was recorded to be 8 cm and narrowing of the vagina was not noted. Only in two cases was deficient vaginal depth observed which was due to inadequate use of the mould in the postoperative period. Histologic study of the specimens obtained from the neovagina revealed normal vaginal mucosa in all patients.
Conclusion : Although numerous methods have been described since the first surgical intervention for the correction of vaginal agenesis, a modified Abbé–McIndoe technique is still the effective and preferred one.

Keywords: Vaginal agenesis; Vaginal reconstruction; Meshed skin graft

1. Introduction

Congenital absence of vagina was first described by Colombus. Mayer described congenital absence of the vagina as one of the abnormalities found in stillborn infants with multiple birth defects. Rokitansky in 1838 and Kuster in 1910 described an entity in which the vagina was absent, a small bipartite uterus was present, the ovaries were normal, and anomalies of other organ systems, especially renal and skeletal, were commonly observed. The disorder has come to be known as the Mayer–Rokitansky–Kuster–Hauser, the Rokitansky–Kuster–Hauser or simply the Rokitansky syndrome [1].

After the time of expected menarche, most patients with vaginal agenesis administer to the physician with the absence of menstrual bleeding and are found to have vaginal agenesis or hypoplasia during physical examination. The uterus may vary from a virtually normal state lacking only a conduit to the introitus to the more characteristic finding of rudimentary bicornuate cords with or without a lumen.

The frequency of vaginal agenesis is not entirely clear, incidences having been reported as one in 4000–5000 female births [2]. First attempt for surgical correction was reported by Dupuytren in 1817 [3]. The use of a split-thickness skin graft to line the vaginal space was first pioneered by Abbé [4]. This procedure, further popularised by McIndoe and Banister [5] is by far the most popular and safe technique. Since its publication in 1938, numerous authors have reported good results in large series. Many modifications of the shape and the material of the mould,

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Fig. 1. A patient with vaginal agenesis in the lithotomy position.

details of the technique, and improvements in post-operative care have been suggested.

In recent years, vaginal construction with flaps has become popular [6–8]. However, there are some disadvantages of these local and free flaps, such as donor-site morbidity and prolonged operation time [8,9]. In the Numune Teaching and Education Hospital, Department of Plastic and Reconstructive Surgery, the old, simple, but effective Abbé–McIndoe technique has been used with a little modification (the use of a meshed split-thickness skin graft to line the vagina) since 1985. Sensoz et al. reported their experience in vaginoplasty for the treatment of 46 cases with vaginal agenesis using meshed split thickness skin graft in 1995 [10]. In this paper, we presented our clinical experiences and long-term results of 22 patients with 7–14 years follow-up period.

2. Materials and methods

From 1985 to 1999, 57 patients were admitted to the Ankara Numune Education and Teaching Hospital, Department of Plastic and Reconstructive Surgery, for construction of the vagina. Follow-up of 22 patients was accomplished over a period ranging between 7 and 14 years. One patient had ambiguous genital as a result of testicular feminization, whereas congenital absence of the vagina was diagnosed in other patients. A further 35 patients, whose preoperative findings were evaluated from their first administration files, were lost to follow-up due to various reasons.

3. Operative technique

3.1. First-generation sephalosporin was administered for antibiotic prophilaxis in the operating room

The patient was placed in the lithotomy position, and a Foley catheter was inserted into the bladder for the ease of identification and protection of the urethra (Fig. 1). General anaesthesia and hypotensive technique was employed. A horseshoe-shaped midline incision at the introitus was made, as described by Abbe–McIndoe. Using a combination of blunt digital and scissor dissection, a cavity was formed digitally to admit two fingers. The vagina was enlarged to 11–13 cm in depth. Urethral catheter and a finger in the rectum aided in preventing inadvertent injury to adjacent structures. Absolute hemostasis is obtained by the use of electrocautery and packing.

A 5 cm × 13 cm split-thickness skin graft from the gluteal area was harvested and meshed in a ratio of ×3 magnification (Fig. 2). An acrylic mould with *bilateral two* longitudinal gutters was wrapped with the meshed split-thickness skin graft (Fig. 3) with its raw surface facing outwards and inserted into the neovagina (Fig. 4). Seroma and hematoma discharged from the neovagina along the gutter. The mould was retained in position for an average of 7 days. Thus, the neovagina could be irrigated via the gutter using a syringe and saline. After 7 days, the mould was removed and the graft was inspected. When the patients were hospitalized for graft stabilization, there were no signs of hematome or infection. A removable mould was subsequently inserted for 4–6 months. The mean duration

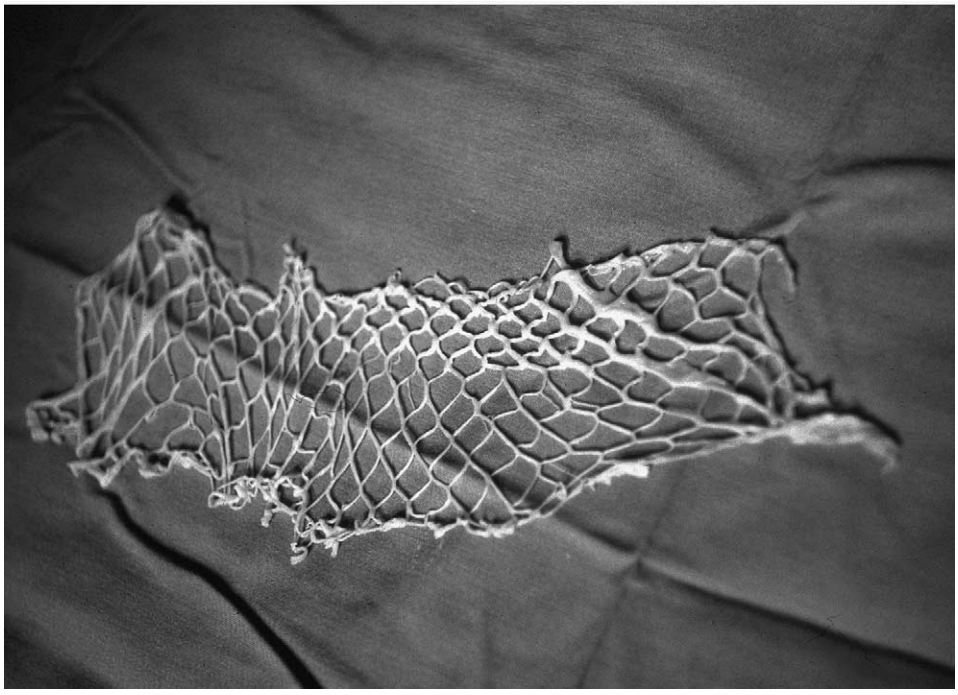

Fig. 2. Meshed skin graft.

of hospitalization was 7 days. In the postoperative period, the patients are taught about removal and reinsertion of the mould and how to administer a douche with warm water.

4. Results

Fifty-seven patients have been treated with the modified Abbé–McIndoe technique. Thirty-five of these patients were lost to follow-up due to *geographical condition and social status of patients*. Preoperative gynaecological findings and extragenital anomalies of all patients are listed in Table 1. Normal vulvar appearance was present in all patients except in one in whom pseudohermaphroditism due to testicular feminization was diagnosed. In 38 patients, no vaginal depth was observed. In 19 patients, a shallow vagina of 1–5 cm depth was recorded. Intravenous pyelography revealed ectopic kidney in two cases and absence of the unilateral kidney in one case. Scoliosis was noted in three patients during X-ray examination.

Fig. 3. Meshed graft wrapped around the mould ready for insertion into the neovagina.

Fig. 4. Mould inserted into the neovagina where it will remain for 7 days.

4.1. The follow-up was performed by two surgeons, one belonging to the team and one not

Findings of the 22 follow-up patients are summarized in Table 2. Gynaecologic examination revealed vaginal depth of 6–10 cm in 20 patients (mean 8 cm) and 3 cm in two patients (Fig. 5). Careful history of these two patients with insufficient vaginal depth revealed short-term (1 month) and incorrect usage of the mould. Müllerian defect was graded according to the classification described by Tary et al. in 1986 [11]. Grading is described as follows: Grade M0—unilateral system normally formed but unfused or septum retained, M1—vaginal agenesis alone, M2—vaginal and uterine agenesis, M3—total Müllerian agenesis and M4—Müllerian and ovarian agenesis. Three of the four patients with normal uterine formation were found to have normal menstrual bleeding after the operation. The husbands of 13 married patients claimed that they had normal sexual intercourse with their wives. Narrowing of the neovagina was not found when the mould was used regularly (admitted two fingers in). Vaginal lining was moistened and pink without desquamation, similar to vaginal mucosa. Biopsies obtained from this lining revealed normal vaginal mucosa in histological examination (Fig. 6). Patient satisfaction with minimal graft donor site morbidity and perfect healing was achieved.

Table 1
Summary of all patients

	Number of patients
Gynaecological findings	
Abdominal	
No vagina	38
1–5 cm vagina	19
No uterus	41
Bifid uterus	5
Hypoplastic single uterus	2
Normal uterus	9
External	
Normal vulva	56
Hypertrophy of clitoris (testicular feminization)	1
Extragenital Anomalies	
Urinary tract abnormalities	
Ectopic kidney with sacral location	2
Congenital absence of left kidney	1
Skeletal abnormalities	
Scoliosis	3

5. Discussion

Numerous methods for the treatment of aplasia of the vagina have been described as non-surgical, such as progressive dilatation (Frank technique) or surgical. A new technique was developed by Veccihetti, which combines surgical and conservative methods and involves epithelization from the outer skin layer [12]. This procedure can be considered as a surgical version of the Frank technique [13].

Although numerous methods have been described since the first surgical intervention for the correction of vaginal agenesis, Abbé–McIndoe technique is still the most popular and preferred one.

Use of other tissue for vaginal lining, such as ileum, caecum, ileocecal segment has been described [14]. The main disadvantages of these procedures are complicated operative procedure requiring long operative time, bleeding

Table 2
Clinical features, classification and examination findings in 22 patients admitted to long-term follow-up

Case no.	Age at surgery (years)	Presentation	Genital defects	Diagnosis (Tarry et al., 1986)	Extragenital anomalies	Vaginal length (cm)	Follow-up (months)
1	13	Pain, mass	Bifid uterus, absence of vagina	M1, M1	None	3	125
2	21	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	6	86
3	17	Primary amenorrhea	Absence of uterus and vagina, tubes hypoplastic	M3, M3	None	10	169
4	16	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	10	158
5	17	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	8	98
6	16	Pain, mass	Left hemiuterus, absence of vagina	M2, M1	Scoliosis	8	135
7	17	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	7	152
8	17	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	8	94
9	19	Primary amenorrhea	Absence of uterus and vagina	M2, M2	Absence of left kidney	3	91
10	22	Primary amenorrhea, pain, mass	Bifid uterus, absence of vagina	M1, M1	None	8	105
11	16	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	9	126
12	19	Pain, mass	Absence of uterus and vagina	M2, M2	None	10	88
13	24	Primary amenorrhea	Absence of uterus and vagina, hypoplasia of tubes and ovaries	M4, M4	None	10	89
14	24	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	10	92
15	25	Primary amenorrhea	Absence of uterus and vagina, hypoplasia of tubes	M3, M3	None	11	96
16	18	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	11	104
17	19	Sexual dysfunction, primary amenorrhea	Absence of uterus and vagina	M2, M2	Ectopic right kidney	9	128
18	13	Pain, mass	Absence of vagina, normal uterus and tubes	M1, M1	None	8	85
19	31	Primary amenorrhea	Absence of uterus and vagina	M2, M2	None	8	97
20	20	Sexual dysfunction, primary amenorrhea	Absence of uterus and vagina	M2, M2	Ectopic left kidney	7	116
21	22	Male pseudoherm-aphroditism	Hypertrophy of clitoris, breast development, no uterus	M4, M4	None	6	92
22	13	Primary ame-norrhea, pain	Absence of vagina, normal uterus and tubes	M1, M1	None	10	108

of the mucosa during coitus, prolapse, peritonitis, and a repulsive odour. Spontaneous epithelization can also be used but this technique requires a long time, and failure is frequent.

Other alternative techniques including gracilis myocutaneous flap [15], rectus abdominis myocutaneous flap [6], an axial subcutaneous pedicle flap from the anterior abdominal wall [16], bulbocavernosus pedicle skin flap

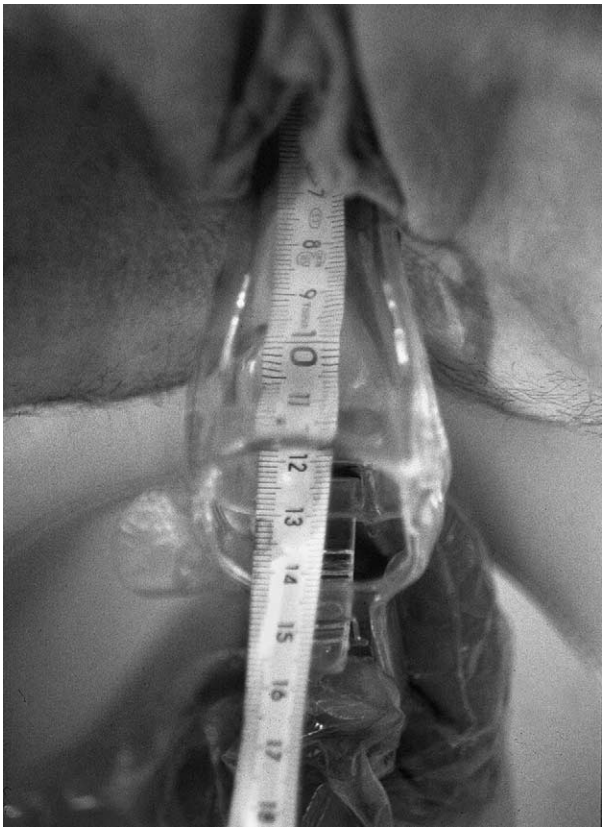

Fig. 5. A follow-up patient with vaginal depth of 8 cm.

Fig. 6. Photomicrography showing orderly squamous epithelium H&E stain (×40).

[17], an axial pedicle vulvoperineal fasciocutaneous flap [18] and scapular free skin flap [9] can also be utilized. All these have their own disadvantages: myocutaneous flaps can be very thick, therefore may cause a narrow vagina. Large donor site scar and prolonged operation time is also inevitable. Flaps prepared from the vulvoperineal region are thin though they carry perineal hairs into the vagina. In neurovascular pudental thigh flaps [19], sensation is not sufficient. Flap surgery should probably be preferred after gynaecological cancer surgery.

In the modified Abbé–McIndoe technique, the graft donor site scar is minimal, the operation time is short, the procedure is technically easy, safe, and is very effective. There were no complications such as seroma, hematoma, or infection in our series. Graft take in the neovagina is increased due to the use of meshed graft, which facilitates drainage. Hence, hospitalization time is decreased. All patients who used mould regularly in the postoperative period were found to have satisfactory vaginal depth and width (average length of vagina was 8 cm and admitted two fingers). Vaginal lining had a completely normal vaginal appearance and the husbands of these patients claimed to have satisfactory sexual intercourse with their wife.

The vast body of literature on the surgical treatment of vaginal agenesis has repeatedly stressed the principles necessary to maximise success and minimise complications with the modified Abbé–McIndoe procedure. The results and experience presented support these principles.

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